



OVERVIEW OF DIAGNOSIS AND TREATMENT OF FOOD ALLERGIES

Food allergies are common amongst children and adults with the prevalence of 8.96%. The main risk factors of food allergy are atopic dermatitis, a family history of atopy, and asthma. There are about 170 foods identified that cause an allergic reaction, however, only a few of these can cause major reactions. Some of the most common allergenic foods are cow's milk, egg, peanut, tree nut, soy, wheat, fish, and shellfish. Allergic reactions are diagnosed using skin prick testing, specific serum IgE testing, and oral food challenges. There is no current treatment for food allergies, however avoiding allergenic and cross-reacting food and being able to recognize and treat the adverse reaction can manage it. This issue of CLIPs describes food allergies and its symptoms, as well as, diagnosis and treatment options. If you need further information, please contact the Center for Healthcare Innovation and Patient Outcomes Research (CHIPOR) at (205) 726-2659.

Patel BY, Volcheck GW. Food allergy: common causes, diagnosis, and treatment. *Mayo Clin Proc.* 2015;90(10):1411-1419.

Background

- Food allergy has the potential to impair quality of life and induce life-threatening reactions.
- Some of the major risk factors include atopic dermatitis, a family history of atopy, and asthma.
- Early exposure to allergen can be preventive. Infants with risk factors for food allergies were randomized to either ingest or avoid peanut butter from 4 to 11 months of age to 5 years old. Investigators found that the children who were exposed to peanut were less likely (70% to 86%) of being allergic to peanuts.
- Most studied allergens are cow's milk, egg, peanut, tree nut, soy, wheat, fish, and shellfish.
- Studies also show that most children are able to outgrow wheat, soy, milk and egg allergies but not peanut, tree nut, fish and shellfish allergies.

Symptomology and Intolerance

- A food allergy is an IgE-mediated reaction and the individual can experience symptoms in various forms.
- Symptoms may be gastrointestinal, respiratory or cardiovascular mediated.
- Symptoms can be seen anywhere from minutes to 2 hours after being exposed to an allergen.
- The terminology food allergy and food intolerance are usually confused. Food intolerance syndromes in children include food protein induced enterocolitis and food protein induced enteropathy.
- Food allergy symptoms occur with the exposure to the specific food, whereas, food intolerance symptoms can present with or without exposure.
- In adults, examples of food intolerances can include lactose intolerance, fructose intolerance, or irritable bowel syndrome.
- Histamine intolerance is another nonimmunologic condition, which can manifest with high histamine containing foods or scombroid poisoning (e.g., ingestion of contaminated food, mainly fish).

Common allergens

- Cow's milk allergy is the most common type of food allergy and is found mainly in children. Children outgrow this allergy by school age. Individuals with this allergy should also avoid goat's milk and sheep's milk. Beef usually decreases the allergenicity of cow's milk; hence it is recommended in these patients not to avoid beef.
- Egg allergy is seen mostly in childhood and outgrows by late childhood. Patients who do not outgrow from an egg allergy may have a higher egg specific IgE level.
- Influenza vaccines are grown in chicken eggs and the vaccines contain small quantities of ovalbumin. Egg allergic patients are still recommended to take this vaccine, even if they have had a severe egg allergic

Common allergens (continued)

- Food allergenicity increases or decreases by high temperature cooking and processing. In eggs and milk high temperatures can decrease its ability to induce an allergic reaction. Baked eggs and milk may work as immunotherapy in these patients, making them more tolerable to these foods overtime.
- Peanut and tree nuts (e.g., walnut, almond, hazelnut, cashew, pecan, pistachio, and brazil nut) both have the ability to induce fatal reactions and can occur in childhood or adulthood. Peanuts have a high rate of cross sensitivity, however, it presents with less clinical cross-reactions between foods in the legume family. On the other hand, cross reactivity between different tree nuts is higher. Individuals with allergy to either of these are recommended to avoid consumption.
- Shellfish allergy develops in adulthood and clinical cross-reactivity between shellfish is noted to be 75%. The main allergen is tropomyosin and has a high rate of conserving its sequence in crustaceans. Individuals with this allergy avoid the consumptions of all shellfish products.
- Fish allergy is seen in adulthood with a cross-reactivity of 50%. Due to cross-reactivity, individuals should avoid all fish containing foods. Patients with fish allergy are able to tolerate shellfish and vice versa.
- Wheat allergy develops in childhood and outgrows over time. It is not recommended to avoid all wheat grains in these patients, as this may be harmful.

Other forms of food allergy

- Oral allergy syndrome is when allergen proteins share homology with environmental pollens, fruits, vegetables and tree nuts. A patient can experience a reaction when they ingest a food that contains a protein closely related to the environmental allergen. If the food has been cooked or processed then the patient should not experience a reaction.
- An IgE antibody to galactose α -1, 3-galactose is found in both cetuximab and red mammalian meat. Patients who have consumed red meat and have taken cetuximab have had a similar allergic reaction. The distribution of cetuximab and delayed red meat reaction overlap with the geographic distribution of the Lone Star tick and that the patients had been bitten by these ticks. All affected patients should avoid all mammalian meat.
- Patients can experience food related reactions due to cofactors, some include exercise, nonsteroidal anti-inflammatory drugs, asthma, infections and alcohol. Wheat-dependent exercise-induced anaphylaxis (WDEIA) is an example and these patients must avoid exercise for 6 hours after wheat ingestion.

Diagnosis

- Diagnosis is based of allergen-specific IgE, skin prick testing and food challenge.
- Allergen-specific IgE and skin prick testing are good indications of the chances of a reaction occurring and the likelihood of outgrowing the allergy.
- Food challenge is used more as a confirmatory procedure and should only be used in a control setting.
- Component-resolved diagnostics is used for specific components of the food verses the whole food.

Treatment

- Food allergy can only be managed not treated. Strict avoidance of allergenic food is important.
- Patients and parents of patients should be educated on how to interpret food labels and potential cross contamination of foods at restaurants and parties.
- Each patient should have an epinephrine auto-injector with them at all times.
- Patients with food allergy are still able to donate blood products.
- Oral immunotherapy and sublingual immunotherapy are also therapeutic options.

Conclusion

- Consider cross-contamination, cross-reactivity and cofactors in every patient.
- Diagnosis is based of blood IgE testing, skin IgE testing or food challenge testing.
- Treatment includes management of reactions, avoidance of food, and education.

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